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The phylogenetically isolated South African endemic diving beetle *Caperhantus cicurius* (Fabricius, 1787): redescription and range extensions (Coleoptera, Dytiscidae, Colymbetinae)

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Abstract. New distribution records and a redescription are presented for *Caperhantus cicurius* (Fabricius, 1787), a diving beetle endemic to the Cape region of South Africa, which is only distantly related to other Afrotropical dytiscids. We show that the species is much more widely distributed than previously recognized and present details of occupied habitats for the first time. *Caperhantus cicurius* occurs throughout the winter rainfall zone in South Africa, from Namaqualand to the Eastern Cape Province, particularly in temporary waters in the Fynbos and Succulent Karoo biomes.

Key words. Aquatic Coleoptera, endemic species, new records, Afrotropical region

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INTRODUCTION

The diving beetle subfamily Colymbetinae has its maximum diversity in temperate regions of the globe, a departure from the usual pattern of increase towards the tropics that may result from phylogenetic niche conservatism following origin in a relatively cool climate (Morinière et al. 2016). Of the 11 genera recognized within this clade, one, *Rhantus* Dejean, 1833, contains over 90 species and occurs in all zoogeographical regions, other genera being substantially less diverse and widely distributed (Nilsson and Hájek 2024). Balke et al. (2017) redefined *Rhantus* and related genera, based on relationships from DNA-based phylogenetic studies (Ribera et al. 2008; Morinière et al. 2016). *Caperhantus* Balke, Hájek & Hendrich, 2017 was erected for a single species, *C. cicurius* (Fabricius, 1787), endemic to the Cape Region of South Africa and formerly included in *Rhantus*, a genus long known to be polyphyletic, as previously defined (Ribera et al. 2008). Morinière et al. (2016) suggested that the closest extant lineage to *C. cicurius* is the western Palaearctic *Melanodytes pustulatus* (Rossi, 1792), these groups apparently diverging in the Oligocene, some 30 MYA, meaning *Caperhantus* is quite distant evolutionarily from other Afrotropical dytiscids, including *Rhantus*. *C. cicurius* is therefore another example of a phylogenetically isolated Cape lineage, lacking close relatives in the region, alongside the dytiscid *Capelatus prykei* Turner & Bilton, 2015 (Bilton et al. 2015) and the cliff water beetle *Aspidytes niobe* Ribera, Beutel, Balke & Vogler, 2002 (Ribera et al. 2002). Despite its evolutionary interest, very little has been published on the distribution and ecology of *C. cicurius*, which is rare in collections; there being no detailed descriptions and very few figures of this beetle in the literature (Sharp 1882; Guignot 1961; Omer-Cooper 1965). Recent fieldwork in South Africa has resulted in many new records for *C. cicurius*, which significantly expand its known geographical and ecological range. These data are presented below, together with a redescription of the species based on newly collected material.

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METHODS

Material. This study is based on the examination of 159 adults and 12 putative larvae of *Caperhantus. cicurius.* Most specimens were newly collected by the authors in the past 20 years.

Photographs and illustrations. All images were taken with a Canon EOS 5D Mark IV camera, fitted to a Leica M205C stereomicroscope, with a 1× objective lens. Specimens were illuminated with gooseneck lights, diffused with a film canister tube. Image stacks were produced by hand and combined using Zerene Stacker (www.zerenesystems.com).

Coordinates. These are given in decimal notation throughout. All localities, both new and historical, were located using Google Earth (http://earth.google.com) to confirm co-ordinates.

Codes.

AMG	Albany Museum, Grahamstown, South Africa
CBP	Collection David T. Bilton, Plymouth, UK
CTP	Collection Clive R. Turner, Plymouth, UK
LUM	Lund University Museum, Lund, Sweden
NHML	Natural History Museum, London, UK

RESULTS

***Caperhantus cicurius* (Fabricius, 1787)**

Dytiscus cicurius Fabricius 1787: 190 (type locality: Cape of Good Hope).
Colymbetes consobrinus Curtis 1828: 207.
Rhantus cicurius (Fabricius)—Sharp 1882: 622; Guignot 1961: 761; Omer-Cooper 1965: 174.
Caperhantus cicurius (Fabricius)—Balke et al. 2017: 93.

Redescription. Based on male characters unless otherwise stated. Balke et al. (2017) defined *Caperhantus* as a monotypic genus on the following combination of characters: large (body length 15–16 mm), slender, torpedo-shaped. Labrum with deep apicomedial emargination. Sides of pronotum distinctly bordered except for anterior angles; posterior pronotal angles weakly obtuse. Elytral surface sculpture double, consisting of moderately large polygonal meshes filled with fine polygonal cells. Setae on parameres distally acute.

Habitus: a relatively large (15–16 mm), slender, elongate colymbetine, larger than most species of *Rhantus* and related genera. Elytral colour pattern, with pale longitudinal lines amongst dark irrorations, unique within the Afrotropical fauna.

Colour: dorsum (Figure 1A) with head reddish brown to black, with a broad, transversely oval orange-yellow patch between compound eyes; front of clypeus and labrum also orange-yellow. Pronotum reddish brown to black; paler medially and anteriorly; with broad orange-yellow lateral margins, broadest anteriorly. Elytra orange-yellow with black irrorations; orange-yellow colour forming distinct longitudinal lines, typically three: one close to suture and one discal with paler areas with limited irrorations along margins. Body appendages, prothorax, prosternal process, pronotal hypomeron, elytral epipleura, yellowish brown to reddish, rest of venter dark brown to black (Figure 3).

Surface sculpture: head (Figures 1A, 2A, D) with irregular meshes and dense, distinct sparse punctation and denser micropunctation, no microreticulation visible; clypeus (Figure 2A) with double punctation only; labrum (Figure 2A) same but punctures distinctly sparser than on clypeus. Pronotal disc (Figure 2B, E) with irregular meshes and punctation as on head; sculpture coalescing into a weakly-defined, narrow central line; becoming more regular, with distinct polygonal meshes towards all margins (Figure 2C); no microreticulation. Elytra (Figure 2F) with distinct, relatively large and irregular polygonal meshes and fine punctation; with distinct polygonal microreticulation within the larger meshes.

Structures: labrum (Figure 2A) with distinct, deep apicomedial emargination, filled with dense setae. Pronotum with broad and conspicuous lateral bead which does not reach anterior angles (Figure 2C). Prosternum (Figure 3A) with well-developed, rounded central ridge; process narrowly lanceolate. Lateral wings of metaventrite triangular (Figure 3B); hind wings fully developed. Last ventrite modified sexually, apex more acuminate in female than male (Figure 3C, D).

Tarsal characters: protarsal claws (Figure 1B) with anterior and posterior claw of almost equal length. Claws slender, straight over middle of ventral face and with no particular modification or teeth. Mesotarsal claws (Figure 1B) sinuate, with posterior claw shorter and slightly more strongly curved than anterior claw, approximately ½ length of mesotarsomere V. Pro- and mesotarsomeres 1–3 somewhat dilated laterally (Figure 1B), with four transverse rows of stalked suction discs ventrally; terminal plate of each suction disc elongate and parallel sided; 10–12 discs in each row.

Genital structure (males): median lobe of aedeagus (Figure 1C) appearing relatively stout and curved with a bluntly rounded apex in lateral view; parameres with a fringe of long yellow hairs which are acute distally rather than expanded (Figure 1D).

Female: colour and surface sculpture as in male. Tarsomeres narrow and without stalked suction discs ventrally. Last ventrite differs as described above.

Variation. Some variation in colour, some individuals being slightly darker than the specimen in Figure 1A.

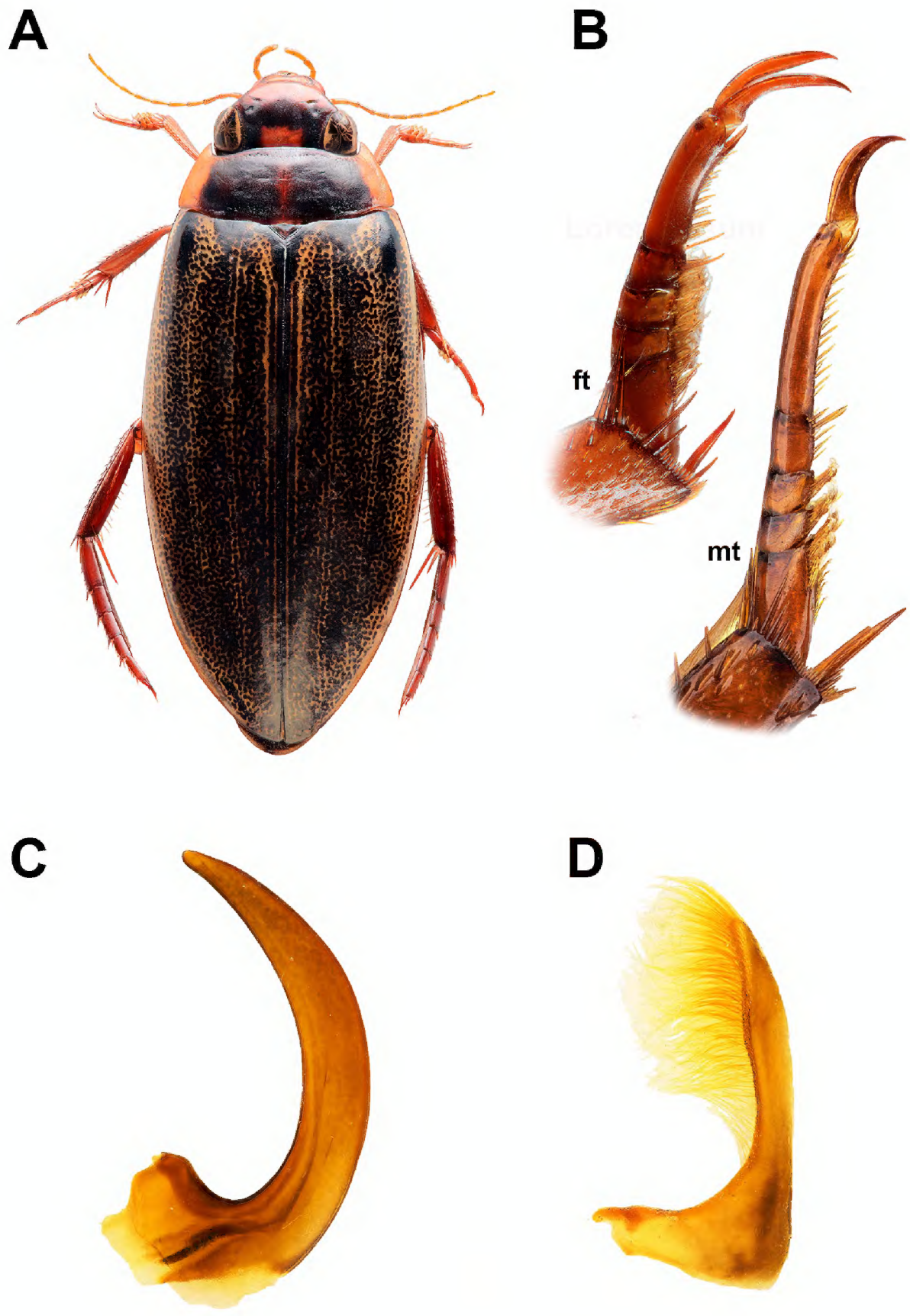

Figure 1. *Caperhantus cicurius*. **A.** Habitus. **B.** Protarsus (ft) and mesotarsus (mt). **C.** Median lobe, lateral view **D.** Paramere, lateral view.

Identification. Unmistakable within the world Colymbetinae fauna on the combination of relatively large size, elongate, torpedo-shaped body, and colour pattern.

Material studied.

Previous records (10 localities). REPUBLIC OF SOUTH AFRICA – Western Cape Province • 3 miles E of Ottery, Varden Vlei; Brinck loc. 163; 34°60′S, 018°30′E; 22.II.1951; P. Brinck leg. [not in LUM] • Uilenkraal River; 34°34′S, 019°28′E; 12.VII.1946; R.W. Rand leg.; 1♂, 4♀, AMG • Caledon, stream in pine wood; 34°13′S, 019°25′E; 18.XI.1949; J. Omer-Cooper leg; 1♀, AMG • Skips Kop Pool; 34°33′S, 020°23′E; 4.VII.1946; J. Grindley leg.; 2♀, AMG • Swellendam; 34°01′S, 020°26′E; [no specimens located; Omer-Cooper 1965 reference only] • Hermanus; 34°24'S, 19°17'E; [no specimens located; Omer-Cooper 1965 reference only] – Eastern Cape Province • Assegaaibos, 30 miles WNW of Humansdorp; Brinck loc. 191; 33°56′S, 024°19′E; 28.II.1951; [not in LUM] • Bathurst District, Kleinemond; 33°30′S, 26°48′E; 6.V.1957 & 30.IX.1957; J. Omer-Cooper leg.; 4♀, AMG – Northern Cape Province • Bokkeveld Plateau, Neiuwoudtville District, Avontuur Reserve, temporary stream; 31°17′S, 019°01′E; 6.X.2015; D.T. Bilton leg.; 2♂, 1♀, CBP • Bokkeveld Plateau, Neiuwoudtville District, Avontuur Reserve, vernal pools on clay; 31°16′S, 019°03′E; 6.X.2015; D.T. Bilton leg. 3 sex indet., CBP.

New records (37 localities). REPUBLIC OF SOUTH AFRICA – Western Cape Province • Somerset West; 34°05″S, 018°50′E; 25.I.1942; J.H. Koch leg.; 1♀, AMG • Muizenberg, pond 10; 34°05′S, 018°29′E; 2.I.1962; A. Harrison leg.; 1♀, AMG • Wynberg Sewerage Works, pond 4; 34°00′S, 018°27′E; 3.I.1962; A. Harrison leg.; 1♀, AMG • Muizenberg; 34°05′S, 018°29′E; 3.VII.1962; J. Omer-Cooper leg.; 1♀, AMG • Malpas road

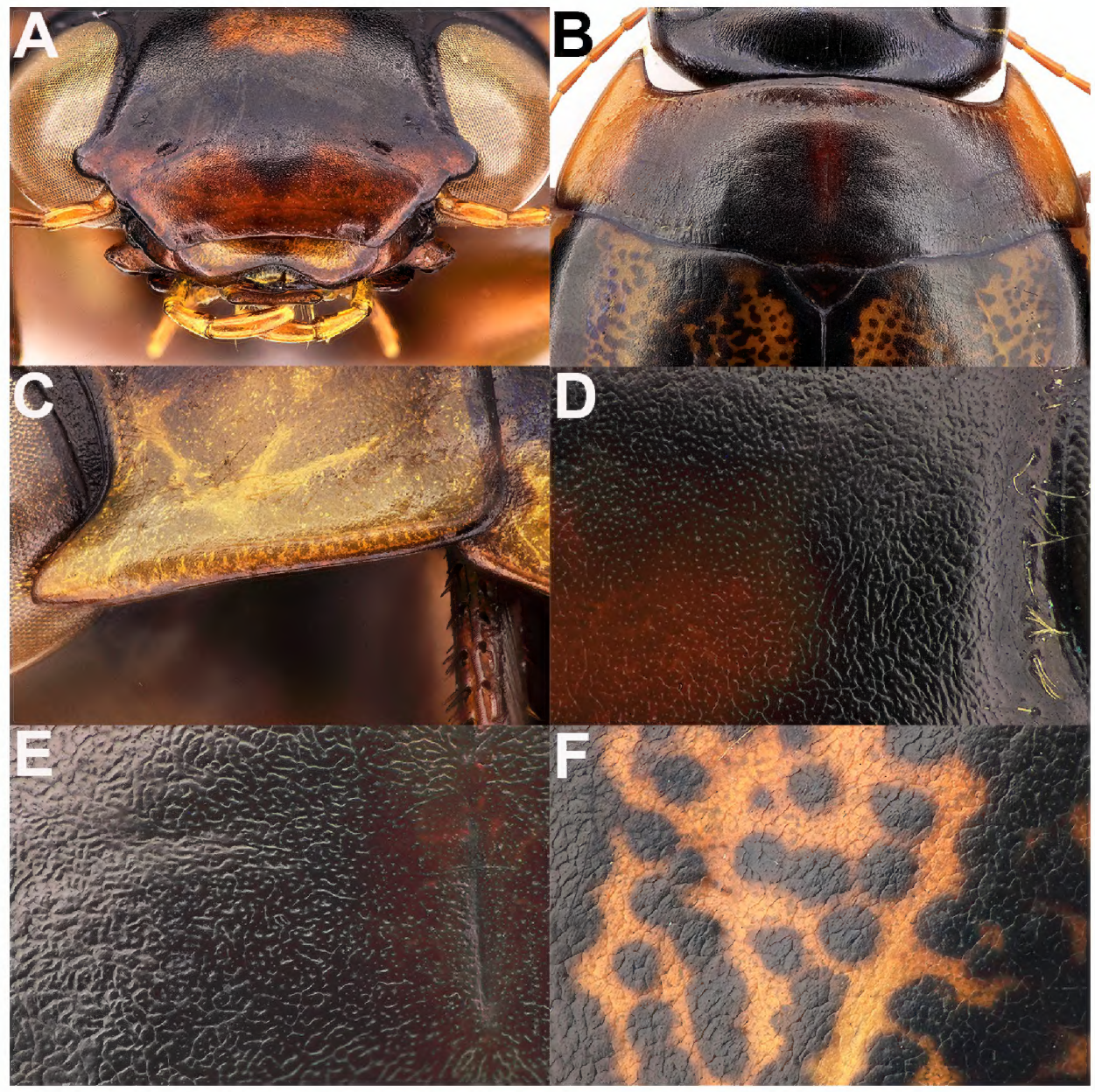

Figure 2. *Caperhantus cicurius*. **A.** Head, frontal view. **B.** Pronotum, dorsal view. **C.** Pronotum, lateral view. **D.** Head, sculpture beside compound eye. **E.** Pronotal disc, sculpture. **F.** Elytral disc, sculpture.

Figure 3. *Caperhantus cicurius*. **A.** Underside of head, pro- and mesothorax. **B.** Underside of meso- and metathorax. **C.** Male last ventrite. **D.** Female, last ventrite.

at De Hoops Junction; 34°23′S, 020°25′E; 4.XII.1995; G.L. Challet leg.; 1♂, AMG • 3 km S Junction of M65 and M66 roads, stream; 34°13′S, 018°24′E; 5.XII.1995; G.L. Challet leg.; 1♀, AMG • Tsitsikamma, stream on road; 34°01′S, 023°52′E; 3.III.1997; G.L. Challet leg.; 1♂, AMG • Milnerton; 33°51′S, 018°30′E; small pool in clay, plant growth thick; 18–20.XI.1949; B. Malkin leg.; 34 sex indet., NHML • ca. 10 km E of Darling, temporary pool by R315 road; 33°20′S, 018°15′E; IX.2002; D.T. Bilton leg.; 2♂, 1♀, CBP • Hopefield; Brinck loc. 19; 33°03′S, 018°20′E; 31.X.50; P. Brinck leg.; 1♀, LUM • Heartlands, Langvlei; 34°03′S, 018°27′E; 12.X.2006; P.E. Reavell leg; 1♂, AMG • West Coast National Park, waterhole at Abrahamskraal; 33°13′S, 018°08′E; 30.IX.2008 & 2.X.2009 & 1.X.2010; D.T. Bilton leg.; 3♂, 4♀, CBP • Pools along Hopefield road near Veldriff, beside Berg River; 32°54′S, 018°20′E; 3.X.2009; D.T. Bilton leg.; 1♂, CBP • Bredasdorp District, SW of Bredasdorp, temporary pond; 34°36′S, 019°57′E; IX.2007; M.C. Mlambo leg.; released • Bredasdorp District, near Quoin Point, temporary pools at Buffelsjachts; 34°43′S, 19°40′E; 26.IX.2010; D.T. Bilton leg.; 1♂, 1♀, CBP • Bredasdorp District, near Quoin Point, hyposaline pool at Buffelsjachts; 34°44′S, 019°39′E; 26.IX.2010; D.T. Bilton leg.; 1♀, CBP • Agulhas Plain, N of Cape Agulhas, temporary pond; 34°45′S, 019°54′E; IX.2007; M.C. Mlambo leg.; released • Stream along road to Towsrivier, ca. 5 km N of Gydopas; 33°13′S, 019°19′E; 22.XI.2011; D.T. Bilton leg.; 3♂, 1♀, CBP • Yzerfontein, spring-fed winter pools in strandveld; 33°20′S, 018°11′E; 5.IX.2012; P.E. Reavell leg.; 1♂, 1♀, AMG • N of Yzerfontein; saline pools by R315 road; 33°20′S 018°11′E; 1.IX.2003; C.R. Turner leg.; 1 sex indet., CTP • De Hoop Nature Reserve, temporary vlei ca. 1 km E of road to beach; 34°27′S, 020°25′E; 23.IX.2013; D.T. Bilton leg.; 3 sex indet., CBP • Cape Flats, Driftsand; 34°00′S, 018°40′E; IX.2007; M.C.Mlambo leg.; released • Table Mountain, Table Mountain National Park; Brinck loc. 83; 33°57′S, 018°24′E; 15.XII.50; P. Brinck leg.; 1♀, LUM • Cape Peninsula, Table Mountain National Park; reservoir on road to Bordjlesrif; 34°18′S, 018°26′E; 15.II.1997; C.R. Turner leg.; 1 sex indet., CTP • Cape Peninsula, Table Mountain National Park; pond on point road; 34°18′S, 018°26′E; 16-17.II.1997; C.R. Turner leg.; 21 sex indet., CTP • Cape Peninsula, Table Mountain National Park; roadside pool; 34°18′S, 018°26′E; 30.VIII.2003; C.R. Turner leg.; 2 sex indet., CTP • Cape Peninsula, Table Mountain National Park, temporary vlei at Olifantsbos; 34°15′S, 18°23′E; 2.X.2014; D.T. Bilton leg.; 4 sex indet., CBP • Cape Peninsula, Table Mountain National Park; vlei 3 miles NE Kommetjie; Brinck loc. 14; 34°05′S, 018°23′E; 24.X.50; P. Brinck leg.; 1♂, 1♀, LUM • ca. 3 km NW of Betty's Bay, temporary pool beside R44 road; 34°20′S, 018°51′E; 3.X.2014; D.T. Bilton leg.; 1♂, 1♀, CBP • Vyeboom; stream near R321 to Villiersdorp; 34°3′S, 019°7′E; 22.II.1997; C.R. Turner leg.; 1 ex., CTP • ca. 5 km E of Kleinmond, pool beside R44 road; 34°19′S, 019°06′E; 3.X.2014; D.T. Bilton leg.; 5 sex indet., CBP • Cederberg, temporary ponds N of Moon River Bush Camp; 32°46′S, 019°27′E; IX.2007 & 16.X.2023; D.T. Bilton & M.C. Mlambo leg.; 1♂, 1♀ CBP • Neiuwoudtville District, stromatolite pool at Nuweplas Farm; 31°18′S, 019°07′E; 11.X.2014; R. Perissinotto leg.; 1♂, 1♀, CBP • Piketberg, stream below Sebrakop; 34°46′S, 018°45′E; 3.X.2015; D.T. Bilton leg.; 1♀, CBP – Northern Cape Province • Tankwa Karoo, Tankwa River on R355 road; 39°19′S, 019°38′E; 2.X.2013; D.T. Bilton leg.; 2 sex indet, CBP • Namaqualand, ca. 30 km south of Garies, Swart Doring River on N7 road; 30°49′S, 018°07′E; 17.IX.2023; D.T. Bilton leg.; 5♂, 5♀, CBP • Namaqualand, ca. 6 km S of Garies, Groen River on N7 road; 30°35′S, 018°00′E; 17.IX.2023; D.T. Bilton leg.; 1 sex indet., CBP • Kamiesberg, small quarry beside road below Studer Pass; 30°24′S, 018°03′E; 18.IX.2023; 2♂, 1♀, 5 ?larvae CBP • Bokkeveld Plateau, Neiuwoudtville District, seasonal pan beside Kromvlei; 31°18′S, 19°00′E; 21.IX.2023; D.T. Bilton leg.; 2♂, 1♀, 7 ?larvae CBP • Namaqualand, Knersvlakte, seasonal pan beside N7 road; 31°15′S, 018°32′E; 21.IX.2023; D.T. Bilton leg.; 2♂, 3♀, CBP • Namaqualand, S of Garies on N7; 30°38′S, 018°03′E; roadside seasonal pools;14.X.2023; C.R.Turner & T.A.Turner leg; 10 sex indet., CTP • Kamiesberg, Kamieskroon, Verbe Farm; 30°02′S, 017°56′E; seasonal pools in Karoo, no emergent vegetation; 15.X.2023; C.R.Turner & T.A.Turner leg.; 12 sex indet., CTP • Kamiesberg, Kamieskroon, Verbe Farm; 30°04′S, 017°55′E; sandy seasonal pools in Karoo, no emergent vegetation; 15.X.2023; C.R.Turner & T.A.Turner leg.; 11 sex indet., CTP • Touws Rivier; 33°19′S, 020°01′E; roadside seasonal pools, sandy with no emergent vegetation; C.R.Turner & T.A.Turner leg.; 6 sex indet., CTP.

Notes. Most early accounts of this species lack detailed localities, simply referring to "Cape" (e.g. Sharp 1882; Guignot 1956). Omer-Cooper (1965) stated that *C. cicurius* is "fairly common in the western Cape" but only lists six localities from this region and two from the Eastern Cape, most of which are represented by specimens we have traced.

Distribution. Northern, Western, and Eastern Cape Provinces of South Africa. Found with certainty throughout the winter rainfall zone, from the Kamiesberg in Namaqualand to the Cape Peninsula, and along the southern Cape coast east to Kleinemond close to Port Alfred, an area of predominantly summer rains (Figure 4). The late Patrick Reavell informed DTB that he recalled finding this beetle in the Richtersveld, in the Northern Cape Province, close to the Namibian border, but we have not been able to locate any specimens from this area. As this is outside the confirmed range, it is indicated with a question mark on Figure 4. Given the presence of *C. cicurius* in Namaqualand, however, including on the arid Knersvlakte, we consider that this species may indeed occur in the Richtersveld and should be searched for in the region in the future.

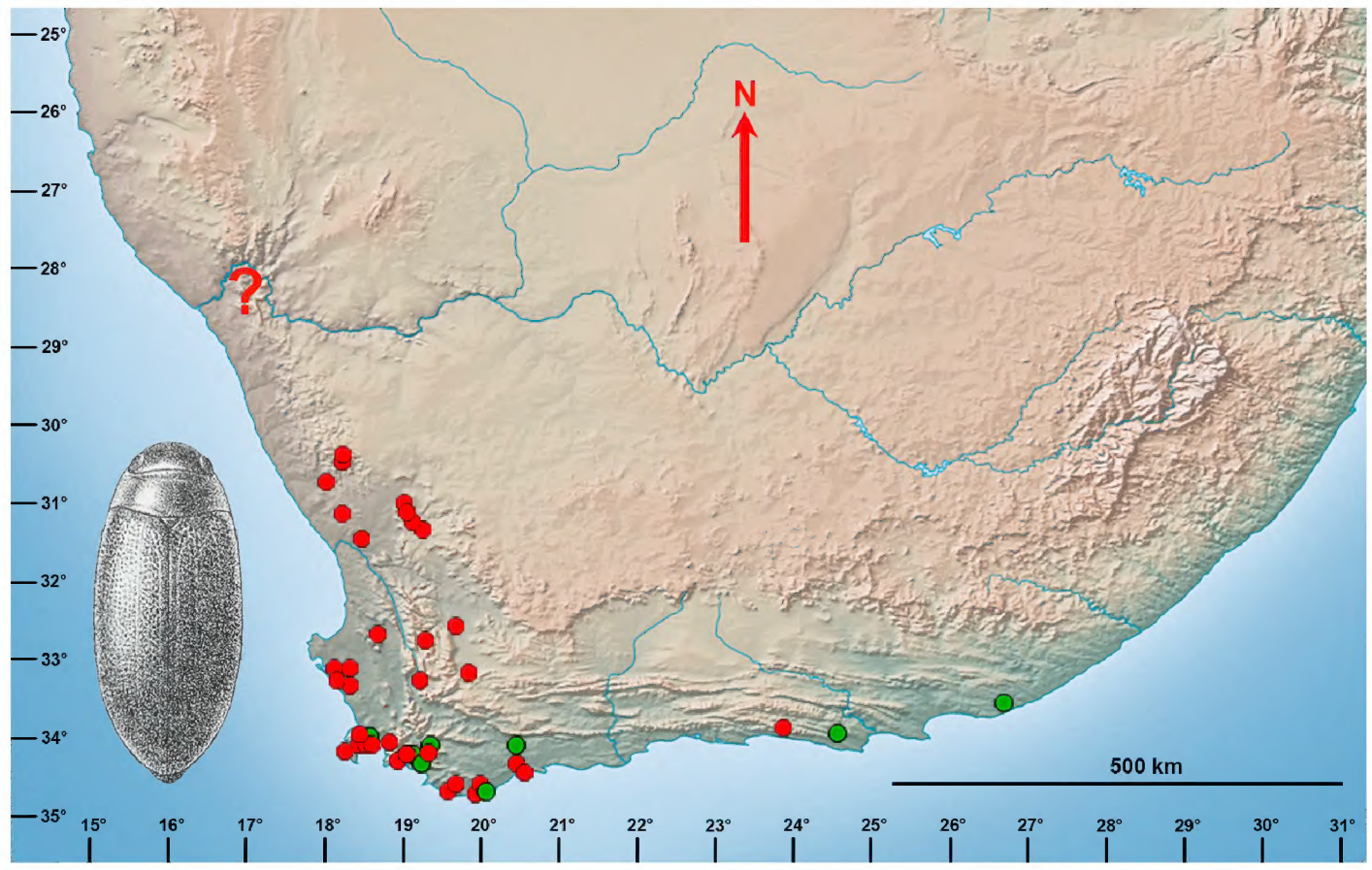

Figure 4. Distribution of *Caperhantus cicurius* in South Africa. Green dots = published records, red dots = new records. Inset:outline of *C. cicurius* after Sharp (1882).

DISCUSSION

We show that *Caperhantus cicurius* is much more widespread in the Cape region of South Africa than previous published records suggest, being present from semi-arid areas of Namaqualand (and possibly as far north as the Richtersveld), through to the Eastern Cape. The species is most frequently recorded from the Fynbos biome, but clearly extends widely into the Succulent Karoo in the Northern Cape Province and Albany Thicket east of Gqeberha (Port Elizabeth) (Mucina and Rutherford 2006). Whilst most frequently recorded from shallow lentic waters, the species can also be found in streams and rivers, where it typically

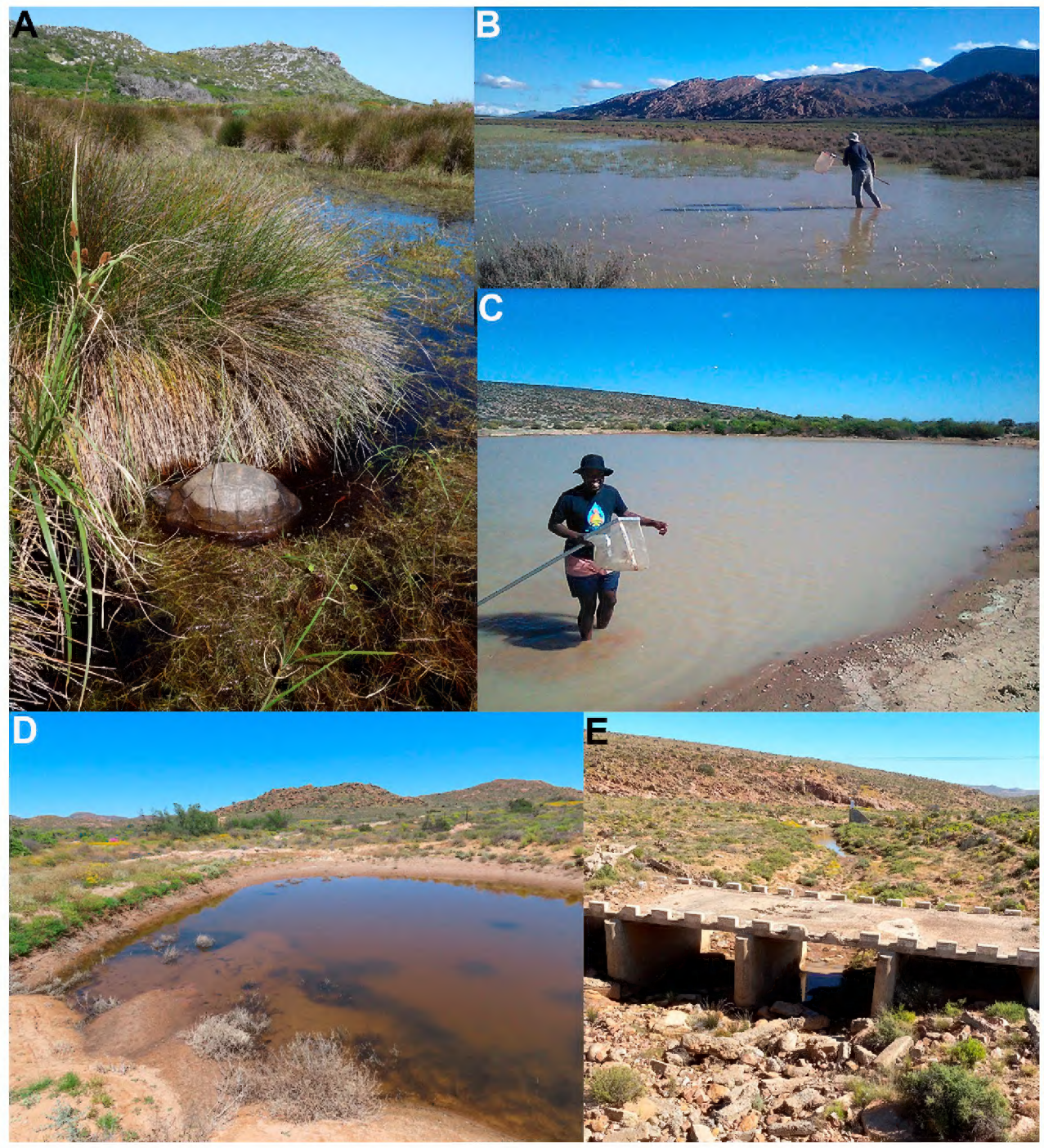

Figure 5. Habitats occupied by *Caperhantus cicurius*. **A.** Table Mountain National Park, temporary, heavily vegetated, acidic vlei at Olifantsbos. **B.** Cederberg, temporary ponds north of Moon River Bush Camp. **C.** Namaqualand, Knersvlakte, seasonal pan beside N7 road. **D.** Kamiesberg, Kamieskroon, Verbe Farm temporary pond. **E.** Namaqualand, pools in Swart Doring River on N7 road.

occupies slower-flowing, vegetated pool margins.

The range of habitats occupied is relatively wide, ranging from well-vegetated temporary fynbos wetlands with clear, acidic waters (Mlambo et al. 2011; Figure 5A), to often turbid seasonal pans on silt (Figure 5B–D) and stream pools (Turner 2008; Bilton 2017; Figure 5E) almost devoid of vegetation. As a consequence, *C. cicurius* is found with a wide range of other water beetles, including *Nebrioporus capensis* (Omer-Cooper, 1953), *Rhantus capensis* (Aubé, 1838), *Copelatus capensis* Sharp, 1882, and Cape endemics such as the dytiscids *Darwinhydrus solidus* Sharp, 1882, *Hydropeplus montanus* Omer-Cooper, 1965, *H. trimaculatus* (Laporte, 1835), and *Andex insignis* Sharp, 1882. On the Knersvlakte in 2023 the species occurred in seasonal pans together with *Eretes sticticus* (Linnaeus, 1767) and *Helophorus brumopluvialis* Bilton, 2023 (e.g., Figure 5C).

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ADDITIONAL INFORMATION

Conflict of interest

The authors declare that no competing interests exist.

Ethical statement

No ethical statement is reported.

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Author contributions

Resources: DTB, MCM, CRT. Identification: DTB, MCM, CRT. Visualization: DTB. Writing – original draft: DTB. Writing – review and editing: DTB, MCM, CRT.

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Data availability

All data that support the findings of this study are available in the main text.

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